FORM PTO-1449 ATTY, DOCKET NO. SERIAL NO. 1-2-0304.1US 10/644,361 U.S. DEPARTMENT OF COMMERCE **APPLICANT** PATENT AND TRADEMARK OFFICE Kwak et al. INFORMATION DISCLOSURE FILING DATE **GROUP** STATEMENT BY APPLICANT August 20, 2003 2661 Use several sheets if necessary) U.S. PATENT DOCUMENTS EXAMINER INITIAL FILING DATE IF APPROPRIATE DOCUMENT NUMBER DATE SUBCLASS 6 2 5 AA 2 03/2001 Dogan et al. AB 6 3 2 9 04/2002 Huang 2 5 AC 6 4 0 06/2001. 2 Hale et al. 6 AD 1 4 11/2000 Raleigh et al. FOREIGN PATENT DOCUMENTS TRANSLATION DOCUMENT NUMBER DATE COUNTRY CLASS SUBCLASS YES NO 6 04/2002 ΑE 20 02 3 2 6 PCT 1 OTHER DOCUMENTS (Including Author, Title, Date, Petinent Pages, Etc.) U.S. Publication No. 2003/0021335 A1, De et al., January 30, 2003. AF U.S. Publication No. 2003/0026325 A1, De et al., February 6, 2003. AG Anja Klein, Ghassan Kawas Kaleh and Paul Walter Baier, "Zero Forcing and Minimum Mean-Square-Error Equalization for Multiuser Detection in Code-Division Multiple-Access Chaquels," IEEE Transactions on AΗ Vehicular Technology, Vol. 45, No. 2, May 1996 Anja Klein, "Data Detection Algorithms Specially Designed for the Downlink of CDINA Mobile Radio Systems," ΑI IEEE 47th Vehicular Technology Conference, Phoenix, AZ, USA, May 4-7, 1997 H.R. Karimi and N.W. Anderson, "A Novel and Efficient Solution to Block-Based Joint-Detection Using AJ Approximate Cholesky Factorization, Motorola GSM Products Division, Swindon, UK, 1998. PA Consulting Group/Racal Instruments Ltd., "Low Cost MMSE-BLE-SD Algorithm for UTRA TOO Mode ΑK Downlink," ETSI STC SMG2 Layer 1 Expert Group, Helsinki, Finland, 8-11th Sept. 1998. Anja Klein and Paul W. Baier, "Linear Unbiased Data Estimation in Mobile Radio Systems Applying CDMA AL IEEE Journal on Selected Areas in Communications, Vol. 11, No. 7, Sept. 1993.

EXAMINER	DATE CONSIDERED		

EXAMINER: Initial if citation considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/25555

According to International Pattern Classification (IPC) or to both national classification and IPC B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) U.S.: 702/196, 340/14.1, 708/520 Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched extending the international search (name of data base and, where praphicable, search terms used) Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched like the searched other than minimum documentation to the extent that such documents are included in the fields searched to be a search of the complete of	A. CLASSIFICATION OF SUBJECT MATTER				
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			U.S. PATENT	T DOCUMENTS				
EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS		DATE IF
VP		6,208,295	03/2001	Dogan et al.				
VF		6,370,0129	04/2002	Huang				
VF		6,252,540	06/2001	Hale et al.				
VP		6,144,711	11/2000	Raleigh et al.				
VP		2003/0021335	01/2003	De et al.	1			
VP		2003/0026325	02/2003	De et al.	<u> </u>			
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		-02/13260	04/2002					
VP	•	02/089346	11/2002	wo				
		OTHER DOCUMENT	S (Including Au	uthor, Title, Date, Pertinent Pag	es, Etc.)			
VP			Detection in Co	ul Walter Baier, "Zero Forcing a ode-Division Multiple-Access Ch chnology, Vol. 45, No. 2, May 1	nannels," IE			
VP		Anja Klein, "Data Detection Algorithms Specially Designed for the Downlink of CDMA Mobile Radio Systems," IEEE 47th Vehicular Technology Conference, Phoenix, AZ, USA, May 4-7, 1997						
VP		H.R. Karimi and N.W. Anderson, "A Novel and Efficient Solution to Block-Based Joint-Detection Using Approximate Cholesky Factorization," Motorola GSM Products Division, Swindon, UK, 1998.						

EXAMINER	DATE CONSIDERED	
/Vineeta Panwalkar/	11/30/2006	

FORM PTO-1449 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE INFORMATION DISCLOSURE STATEMENT BY APPLICANT			ATTY. DOCKET NO. SERIAL NO. 10/644,361					
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	_	DOCUMENT NUMBER D	DATE	COUNTRY	CLASS	SUBCLASS	YES	NO
<u></u>								
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)								
VP		PA Consulting Group/Racal Instruments Ltd., "Low Cost MMSE-BLE-SD Algorithm for UTRA TDD Mode Downlink," ETSI STC SMG2 Layer 1 Expert Group, Helsinki, Finland, 8-11th Sept. 1998.						
VP		Anja Klein and Paul W. Baier, "Linear Unbiased Data Estimation in Mobile Radio Systems Applying CDMA, " IEEE Journal on Selected Areas in Communications, Vol. 11, No. 7, Sept. 1993.						
VP		Vollmer et al., "Comparative Study of Joint-Detection Techniques for TD-CDMA Based Mobile Radio Systems", IEEE Journal on Selected Areas in Communications, IEEE, Vol. 19, No. 8, August 2001, pp. 1461-1475.						
VP	•	Pan et al., "Low Complexity Data Detection Using Fast Fourier Transform Decomposition of Channel Correlation Matrix", 2001 IEEE Global Telecommunications Conference, Vol. 2 of 6, November 2001, pp. 1322-1326.						

/Vineeta Panwalkar/	DATE CONSIDERED		
	11/30/2006		